

DRAWINGS ATTACHED

(1) Application No. 17634/69 (2) Filed 3 April 1969
(3) Complete Specification published 6 April 1972
(4) International Classification F 04 D 1/06 G/ G 01 H 1/32 A 61 m 1/02

(5) Index to acceptance
PLR 1410 2013 1RS
ATT 231 420
REV 410 47

(7) Invention CHARLES GILBERT THEEL



(6) IMPROVED DISPENSING DEVICES FOR USE WITH OR INCLUDING AEROSOL DISPENSING CONTAINERS

(71) We, RICE LABORATORIES Inc., a Corporation organized and existing under the laws of the State of Delaware, United States of America, 15001 Northside Court, Northridge, California, United States of America, do hereby declare the invention, for which we may that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to a dispensing device which is particularly suited for dispensing and administering measured amounts of fluids. The primary use for such a device is in dispensing measured amounts of a medicament containing aerosol for inhalation therapy.

The invention provides a dispensing device for use in combination with a self-propelling container charged with an aerosol dispensing liquid composition and equipped with a metering valve including a valve stem formed with a discharge tube, which valve stem is connected to an outer chamber and an inner chamber between an outer charging end and an inner discharging portion for said metering valve, and comprising: a housing for receiving said container for engagement of said container within said housing, said housing including a support member having an opening for receiving said discharge tube and providing a discharge passage for said tube; a spring means carried in said housing for urging said container toward said discharging portion and said valve toward said discharging portion, the spring means being compressible to a closed position relative to said passage; and a handle for actuating said spring means to urge said valve to said discharging position.

According to a further feature of the invention said spring means is positioned at the end of said housing opposite said support member, and the

dispensing device includes generally accessible means for applying a force to said container for compressing said spring to said closed position.

The manually accessible means may include first and second portions of said housing accessible relative to each other, with said support member to said first portion and said spring to said second portion.

In one form said housing includes means which may include a lever arrangement capable with said container and push rod engaging said lever arrangement and providing elasticity of said housing.

According to another feature of the invention, there is another accessible means for compressing said spring means to said closed position, and said latch incorporating bias means urging the latch to the latching position.

In the form said housing includes means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In still other forms the air passage may include a tubular section, with said latch extending to said tubular section adjacent one end thereof, and in which said tubular section carries a bulb-like member capable of being displaced to impact said latch under the influence of the pressure differential.

Alternatively said manually accessible means may comprise a valve disposed in said substantially blocking said air passage, with a pressure differential across the valve in the closed position causing the valve to rotate about its axis to the open position.

According to yet another feature of the invention there is a handle for actuating said spring means to release said valve to said discharging position, with said handle in latching said spring means to said closed position, with said handle means disposed when in said latched position to engage said latch blocking the tripping element.

thus, bringing the biased opening 39 into the chamber of the housing 33. The measured charge of material within the housing 33 is discharged through the tubular end 38 of the stem of the valve.

With the upper portion 22 of the housing removed, the container 20 is positioned in the lower portion 23, with the tubular end 38 of the valve stem engaged with the tubular end 39 of the housing 33. The housing 33 is provided with a discharge passage 44 in the lower portion 23, with the tubular end 38 of the valve stem engaged with the discharge passage 44. The valve stem 38 is provided with a lower portion 23 of the housing for engaging the container 20, the housing 33 being provided with a lower portion 23 of the housing for engaging the container 20, the housing 33 being provided with a lower portion 23 of the housing for engaging the container 20.

There is an air passage through the device starting at the bottom of the tubular passage 43, through the opening 45 into the upper portion 22 of the housing, around the container 20 to the lower portion of the housing and out through the monopiece 41. When the patient starts to inhale, a pressure differential is produced across the trigger member 66, causing the trigger member to be moved and impact the stem 60 of the latch lever 51, so as to move the latch lever 51 in the direction of the arrow 67 in Figure 2. This impact tips the latch lever and releases the moving element 47, so that the container 20 is moved from the position of Figure 4 to the position of Figure 2, discharging the measured dose through the passage 44 into the mouthpiece 45 for inhalation by the patient, thereby completing the cycle of operation of the dispensing device.

An alternative form of the dispensing device is illustrated in Figures 10 and 11, with the container 20 carried in a one-piece housing 77 having the general configuration of the housing of the earlier embodiment. The container is inserted through the open top of the housing, with the tubular end 38 of the valve stem inserted into the passage member 43. A spring member 76 is positioned over the container and a cover 77 is removably inserted into the housing 77 to enclose the container 20. The cover 77 typically may be a plastic housing or an end cap member.

The device may be designed to provide this open air passage through the device through the valve 59 when the handle 31 is in the unlatched position of Figure 11. Alternatively, in a second form of the device, the valve 59 is in the latched position of Figure 11, with the handle 31 in the unlatched position of Figure 11, with the handle 31 in the unlatched position of Figure 11, with the handle 31 in the unlatched position of Figure 11.

compared, as by placing the thumb at the bottom and the fingers at the top of the housing 33. The moving element 47 is moved to the position of Figure 3, so compressing the spring 49 and 50. The bias 51 of the latch lever engages the notch 54 of the moving element, thus locking the spring system. The manual compression force is now released and the container 20 is moved to the position of Figure 4 by the spring 54 of the valve stem to move the container upward with respect to the lower portion 23 of the housing. The device is now closed and latched, and the metering valve is charged. If desired, the plug 64 may be moved to the off or latching position. When the patient is ready for a dose, the locking device is turned to the open position and the monopiece 41 is positioned in the patient's mouth.

There is an air passage through the device starting at the bottom of the tubular passage 43, through the opening 45 into the upper portion 22 of the housing, around the container 20 to the lower portion of the housing and out through the monopiece 41. When the patient starts to inhale, a pressure differential is produced across the trigger member 66, causing the trigger member to be moved and impact the stem 60 of the latch lever 51, so as to move the latch lever 51 in the direction of the arrow 67 in Figure 2. This impact tips the latch lever and releases the moving element 47, so that the container 20 is moved from the position of Figure 4 to the position of Figure 2, discharging the measured dose through the passage 44 into the mouthpiece 45 for inhalation by the patient, thereby completing the cycle of operation of the dispensing device.

An alternative form of the dispensing device is illustrated in Figures 10 and 11, with the container 20 carried in a one-piece housing 77 having the general configuration of the housing of the earlier embodiment. The container is inserted through the open top of the housing, with the tubular end 38 of the valve stem inserted into the passage member 43. A spring member 76 is positioned over the container and a cover 77 is removably inserted into the housing 77 to enclose the container 20. The cover 77 typically may be a plastic housing or an end cap member.

with a discharge passage 44 in the lower portion 23, with the tubular end 38 of the valve stem engaged with the discharge passage 44. The valve stem 38 is provided with a lower portion 23 of the housing for engaging the container 20, the housing 33 being provided with a lower portion 23 of the housing for engaging the container 20.

There is an air passage through the device starting at the bottom of the tubular passage 43, through the opening 45 into the upper portion 22 of the housing, around the container 20 to the lower portion of the housing and out through the monopiece 41. When the patient starts to inhale, a pressure differential is produced across the trigger member 66, causing the trigger member to be moved and impact the stem 60 of the latch lever 51, so as to move the latch lever 51 in the direction of the arrow 67 in Figure 2. This impact tips the latch lever and releases the moving element 47, so that the container 20 is moved from the position of Figure 4 to the position of Figure 2, discharging the measured dose through the passage 44 into the mouthpiece 45 for inhalation by the patient, thereby completing the cycle of operation of the dispensing device.

An alternative form of the dispensing device is illustrated in Figures 10 and 11, with the container 20 carried in a one-piece housing 77 having the general configuration of the housing of the earlier embodiment. The container is inserted through the open top of the housing, with the tubular end 38 of the valve stem inserted into the passage member 43. A spring member 76 is positioned over the container and a cover 77 is removably inserted into the housing 77 to enclose the container 20. The cover 77 typically may be a plastic housing or an end cap member.

The device may be designed to provide this open air passage through the device through the valve 59 when the handle 31 is in the unlatched position of Figure 11. Alternatively, in a second form of the device, the valve 59 is in the latched position of Figure 11, with the handle 31 in the unlatched position of Figure 11, with the handle 31 in the unlatched position of Figure 11.

The invention also provides a dispensing device having a housing; an aerosol dispensing container carried in said housing and charged with a self-propelling liquid composition; metering valve means coupled to said container and movable between a charging position for receiving a charge from said container and a discharging position for dispensing said charge; said housing including first and second portions defining relative to each other; a spring means carried in said housing between said first portion and said container for urging said container against said second portion and said metering valve means to said discharging position, said first and second portions being incompressible for compressing said spring means to a closed position for convenient of said metering valve means to said charging position; a latch for latching said spring means in said closed position; said housing including means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In one form said housing includes means which may include a lever arrangement capable with said container and push rod engaging said lever arrangement and providing elasticity of said housing.

According to another feature of the invention, there is another accessible means for compressing said spring means to said closed position, and said latch incorporating bias means urging the latch to the latching position.

In the form said housing includes means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In still other forms the air passage may include a tubular section, with said latch extending to said tubular section adjacent one end thereof, and in which said tubular section carries a bulb-like member capable of being displaced to impact said latch under the influence of the pressure differential.

Alternatively said manually accessible means may comprise a valve disposed in said substantially blocking said air passage, with a pressure differential across the valve in the closed position causing the valve to rotate about its axis to the open position.

According to yet another feature of the invention there is a handle for actuating said spring means to release said valve to said discharging position, with said handle in latching said spring means to said closed position, with said handle means disposed when in said latched position to engage said latch blocking the tripping element.

The specific embodiments of the invention will now be described by way of example with reference to the accompanying drawings, of which:

Figure 1 is a view from above of a preferred embodiment of the dispensing device of the invention, and

Figure 2 is a sectional view taken along the line 2-2 of Figure 1 showing the device in the discharging position,

Figure 3 is a view similar to that of Figure 2 showing the device in the charging position,

Figure 4 is a view similar to that of Figure 2 and 3 showing the device in the closed position,

Figure 5 is a partial sectional view taken along the line 5-5 of Figure 2,

Figure 6 is a sectional view taken along the line 6-6 of Figure 4,

Figure 7 is a sectional view taken along the line 7-7 of Figure 4,

Figure 8 is a partial view similar to Figure 6 showing the device in the latched or open position,

Figure 9 is an isometric view of a preferred trigger means of the device of Figure 1 to 4,

Figure 10 is a sectional view similar to that of Figure 4 showing an alternative embodiment of the device in the closed and latched position, and

Figure 11 is a view similar to Figure 10 showing the device in the discharging position.

As shown in Figure 1, the device includes a housing 33, an aerosol dispensing container 20 carried in said housing and charged with a self-propelling liquid composition; metering valve means coupled to said container and movable between a charging position for receiving a charge from said container and a discharging position for dispensing said charge; said housing including first and second portions defining relative to each other; a spring means carried in said housing between said first portion and said container for urging said container against said second portion and said metering valve means to said discharging position, said first and second portions being incompressible for compressing said spring means to a closed position for convenient of said metering valve means to said charging position; a latch for latching said spring means in said closed position; said housing including means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In one form said housing includes means which may include a lever arrangement capable with said container and push rod engaging said lever arrangement and providing elasticity of said housing.

According to another feature of the invention, there is another accessible means for compressing said spring means to said closed position, and said latch incorporating bias means urging the latch to the latching position.

In the form said housing includes means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In still other forms the air passage may include a tubular section, with said latch extending to said tubular section adjacent one end thereof, and in which said tubular section carries a bulb-like member capable of being displaced to impact said latch under the influence of the pressure differential.

Alternatively said manually accessible means may comprise a valve disposed in said substantially blocking said air passage, with a pressure differential across the valve in the closed position causing the valve to rotate about its axis to the open position.

According to yet another feature of the invention there is a handle for actuating said spring means to release said valve to said discharging position, with said handle in latching said spring means to said closed position, with said handle means disposed when in said latched position to engage said latch blocking the tripping element.

The invention also provides a dispensing device having a housing; an aerosol dispensing container carried in said housing and charged with a self-propelling liquid composition; metering valve means coupled to said container and movable between a charging position for receiving a charge from said container and a discharging position for dispensing said charge; said housing including first and second portions defining relative to each other; a spring means carried in said housing between said first portion and said container for urging said container against said second portion and said metering valve means to said discharging position, said first and second portions being incompressible for compressing said spring means to a closed position for convenient of said metering valve means to said charging position; a latch for latching said spring means in said closed position; said housing including means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In one form said housing includes means which may include a lever arrangement capable with said container and push rod engaging said lever arrangement and providing elasticity of said housing.

According to another feature of the invention, there is another accessible means for compressing said spring means to said closed position, and said latch incorporating bias means urging the latch to the latching position.

In the form said housing includes means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In still other forms the air passage may include a tubular section, with said latch extending to said tubular section adjacent one end thereof, and in which said tubular section carries a bulb-like member capable of being displaced to impact said latch under the influence of the pressure differential.

Alternatively said manually accessible means may comprise a valve disposed in said substantially blocking said air passage, with a pressure differential across the valve in the closed position causing the valve to rotate about its axis to the open position.

According to yet another feature of the invention there is a handle for actuating said spring means to release said valve to said discharging position, with said handle in latching said spring means to said closed position, with said handle means disposed when in said latched position to engage said latch blocking the tripping element.

The specific embodiments of the invention will now be described by way of example with reference to the accompanying drawings, of which:

Figure 1 is a view from above of a preferred embodiment of the dispensing device of the invention, and

Figure 2 is a sectional view taken along the line 2-2 of Figure 1 showing the device in the discharging position,

Figure 3 is a view similar to that of Figure 2 showing the device in the charging position,

Figure 4 is a view similar to that of Figure 2 and 3 showing the device in the closed position,

Figure 5 is a partial sectional view taken along the line 5-5 of Figure 2,

Figure 6 is a sectional view taken along the line 6-6 of Figure 4,

Figure 7 is a sectional view taken along the line 7-7 of Figure 4,

Figure 8 is a partial view similar to Figure 6 showing the device in the latched or open position,

Figure 9 is an isometric view of a preferred trigger means of the device of Figure 1 to 4,

Figure 10 is a sectional view similar to that of Figure 4 showing an alternative embodiment of the device in the closed and latched position, and

Figure 11 is a view similar to Figure 10 showing the device in the discharging position.

As shown in Figure 1, the device includes a housing 33, an aerosol dispensing container 20 carried in said housing and charged with a self-propelling liquid composition; metering valve means coupled to said container and movable between a charging position for receiving a charge from said container and a discharging position for dispensing said charge; said housing including first and second portions defining relative to each other; a spring means carried in said housing between said first portion and said container for urging said container against said second portion and said metering valve means to said discharging position, said first and second portions being incompressible for compressing said spring means to a closed position for convenient of said metering valve means to said charging position; a latch for latching said spring means in said closed position; said housing including means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In one form said housing includes means which may include a lever arrangement capable with said container and push rod engaging said lever arrangement and providing elasticity of said housing.

According to another feature of the invention, there is another accessible means for compressing said spring means to said closed position, and said latch incorporating bias means urging the latch to the latching position.

In the form said housing includes means defining an air passage through said housing, and said trigger includes an element disposed in said air passage and inoperative to engage said tip and latch, with a pressure differential in said air passage across said element producing such movement.

In still other forms the air passage may include a tubular section, with said latch extending to said tubular section adjacent one end thereof, and in which said tubular section carries a bulb-like member capable of being displaced to impact said latch under the influence of the pressure differential.

Alternatively said manually accessible means may comprise a valve disposed in said substantially blocking said air passage, with a pressure differential across the valve in the closed position causing the valve to rotate about its axis to the open position.

According to yet another feature of the invention there is a handle for actuating said spring means to release said valve to said discharging position, with said handle in latching said spring means to said closed position, with said handle means disposed when in said latched position to engage said latch blocking the tripping element.

number slidable in said tubular section to impart said back under the influence of the pressure differential.

8. A device as claimed in claim 6 in which said movable means comprises a wedge disposed in and substantially blocking said air passage, with a pressure differential moving said wedge to any said back.

9. A device as claimed in any one of claims 1 to 7 and including locking means movable between locked and unlocked positions when said back is in locking said spring to said control position, with said locking means disposed when in said locked position to engage said back blocking the clamping thereof.

10. A dispensing device having a housing, an internal dispensing member located in said housing and charged with a self-propelling liquid composition, metering valve means coupled to said member and movable between a charging position for receiving a charge from said container and a discharging position for dispensing said charge, a spring means carried in said housing between said metering valve means to said charging position, a back engaging said push member for locking said spring means in said locked position, said housing including means defining an air passage through and a valve member disposed in and substantially blocking said air passage and coupled to said back, the arrangement being such that a pressure differential in said air passage causes said valve member to open said back and release said spring means, and so urges said metering valve means to said discharging position.

11. A device substantially as hereinbefore described with reference to and as shown in Figures 1 to 9, or in Figures 10 and 11 of the accompanying drawings.

12. A device substantially as hereinbefore described with reference to and as shown in Figures 1 to 9, or in Figures 10 and 11 of the accompanying drawings.

pressure differential in said air passage for slipping said back to release said spring means, and so urging metering valve means to said discharging position.

11. A dispensing device having a housing, an internal dispensing member located in said housing and charged with a self-propelling liquid composition, metering valve means coupled to said member and movable between a charging position for receiving a charge from said container and a discharging position for dispensing said charge, a spring means carried in said housing between said metering valve means to said charging position, a back engaging said push member for locking said spring means in said locked position, said housing including means defining an air passage through and a valve member disposed in and substantially blocking said air passage and coupled to said back, the arrangement being such that a pressure differential in said air passage causes said valve member to open said back and release said spring means, and so urges said metering valve means to said discharging position.

12. A device substantially as hereinbefore described with reference to and as shown in Figures 1 to 9, or in Figures 10 and 11 of the accompanying drawings.

13. A device substantially as hereinbefore described with reference to and as shown in Figures 1 to 9, or in Figures 10 and 11 of the accompanying drawings.

14. A device substantially as hereinbefore described with reference to and as shown in Figures 1 to 9, or in Figures 10 and 11 of the accompanying drawings.

15. A device substantially as hereinbefore described with reference to and as shown in Figures 1 to 9, or in Figures 10 and 11 of the accompanying drawings.

KEITH & COOKSON,
Agents for the Application,
6 Becon's Buildings,
London ECGA 1EN.

Printed for His Majesty's Stationery Office by the Courier Press, Loughborough, Leics., 1971.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AT, Great Britain, which copies may be obtained.

